

We claim:

1. A method of encoding data onto an object, comprising:
 - a) preparing a carrier medium containing quantum dots selected to give said carrier medium defined fluorescent emission characteristics encoding predetermined information; and
 - b) applying said carrier medium to said object.
2. A method as claimed in claim 1, wherein the concentration and type of said quantum dots are selected to give said carrier medium defined emission characteristics.
3. A method as claimed in claim 2, wherein said carrier medium comprises an ink that is applied to said object in the form of a microscopic or macroscopic drop.
4. A method as claimed in claim 3, wherein a protective coating is applied over said microscopic or macroscopic drop.
5. A method as claimed in claim 3, wherein said ink further comprises a polymer or a mix of polymers and solvent(s).
6. A method as claimed in claim 1, wherein said ink further comprises additives to improve viscosity and adhesion properties.
7. A method as claimed in claim 1, wherein said quantum dots are made from semiconductor materials.
8. A method as claimed in claim 1, wherein said quantum dots are made from materials in IVA and VIA of the periodic table.
9. A method as claimed in claim 1, wherein said quantum dots are selected from the group consisting of: cadmium selenide, cadmium sulfide, zinc selenide, and zinc sulfide.

10. A method as claimed in claim 3, wherein quantum dots with different emission wavelengths are distributed homogenously in said ink.
11. A method of decoding information encoded by the emission characteristics of quantum dots in a carrier medium, comprising:
- 5 exciting the quantum dots in said carrier medium to initiate fluorescence; and
 processing the resulting emission spectra to extract said decoded information.
12. A method as claimed in claim 11, wherein said emission spectra are processed to remove noise and ensure spectral line separation.
13. A method as claimed in claim 12, wherein said noise is removed with a digital
 10 filter.
14. A method as claimed in claim 13, wherein said spectral lines are separated by a de-convolution operation.
15. A method as claimed in claim 14, wherein said de-convolution operation is represented by the equation:
- 15 $\sum_i k(\lambda_i) \cdot \delta(\lambda - \lambda_i) = IFT\{ FT[f(\lambda)] / FT[p(\lambda)] \},$
- where $\delta(\lambda)$ represent an impulse function, $k(\lambda_i)$ is the intensity of a $\delta(\lambda)$ at λ_i , $p(\lambda)$ denotes the profile function of the spectrum of quantum dots.
16. A method as claimed in claim 14, wherein said information is extracted from the positions and intensities of spectral lines with reference to a predetermined code book.
- 20 17. An apparatus for decoding information encoded by the emission characteristics of quantum dots in a carrier medium, comprising:
- a light source for exciting said quantum dots to emit light;

a spectroscopic detector for detecting said emitted light; and
a processor for extracting said encoded information from the emission characteristics of said quantum dots.

18. An apparatus as claimed in claim 17, processor is responsive to the intensity and
5 emission spectra of said quantum dots to extract said encoded information.
19. An apparatus as claimed in claim 18, wherein said processor includes a digital filter for removing noise.
20. An apparatus as claimed in claim 19, wherein said processor performs a de-convolution operation to enhance separation of spectral lines in said emission spectra.
- 10 21. An apparatus as claimed in claim 17, wherein said detector is coupled to said light source by a first optical fiber surrounded by a bundle of optical fibers connected to said light source.
22. An apparatus as claimed in claim 20, wherein said bundle of optical fibers terminates in an inverted funnel.
- 15 23. An apparatus as claimed in claim 17, wherein said processor is a computer connected to said spectrum sensor.